Take One

Excel 2013: Business Spreadsheets
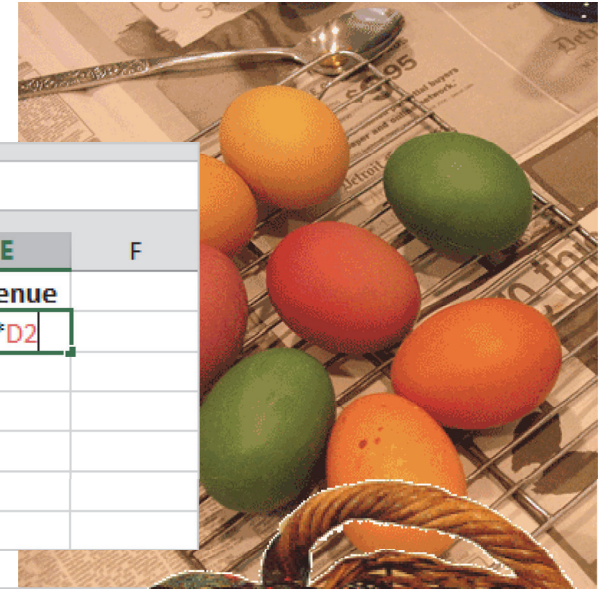
Legs, Eggs and Pigs in a Basket

Intermediate Excel Objectives
In this lesson, you will learn how to:

1. Format data and content.

2. Fill a series with AutoFill.

3. Calculate revenue with a formula.

4. Summarize the data.

5. Identify Relative References.

6. Identify errors and troubleshoot equations.

7. Use the Auditing Toolbar.

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D2		:	✕	✓	*fx*	=C2*D2	

	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Eggs	$ 1.50	100	=C2*D2	
3	July 2, 2013	Eggs	$ 1.50	105		
4	July 3, 2013	Eggs	$ 1.50	110		
5	July 4, 2013	Eggs	$ 1.50	115		
6	July 5, 2013	Eggs	$ 1.50	120		
7	July 8, 2013	Eggs	$ 1.50	125		

C2		:	✕	✓	*fx*	=Legs!E2+Eggs!E2+Pigs!E2	

	A	B	C	D	E	F
1	Date	Product	Revenue			
2	July 1, 2013	All Products	$1,262.50			
3	July 2, 2013	All Products	$1,291.00			

HOME

Lesson 1: Legs, Eggs and Pigs in a Basket

1. Readings

Read Lesson 1 in the Intermediate Excel guide, page 11-48.

Project

A spreadsheet that calculates the daily sales for three products and adds up the total on a summary spreadsheet.
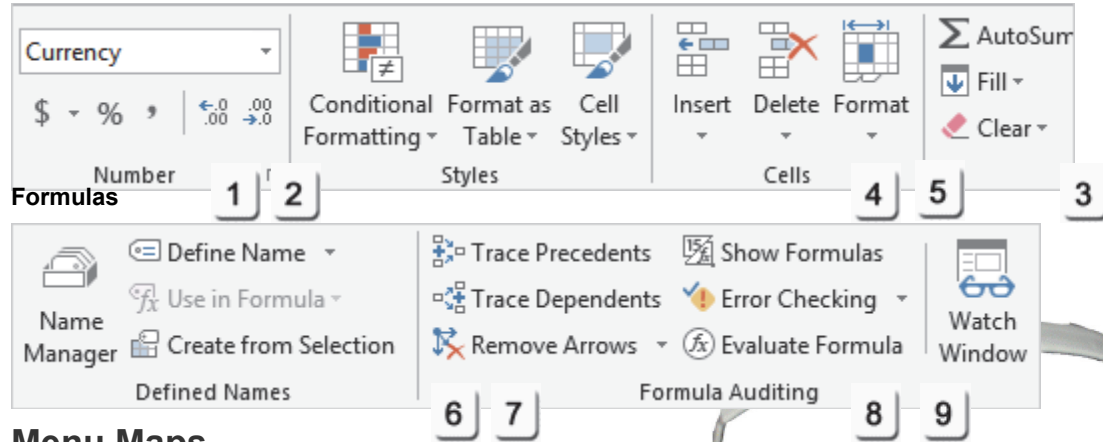
Downloads

Legs Eggs Pigs 2013.xlsx

2. Practice

Complete the Practice Activity on page 49.

### 3. Assessment

Review the Test questions on page 50.

Home

Formulas

Menu Maps

This lesson show options on the Home and Formulas Ribbons.

1. Home->Number->Date, page 15
2. Home->Number->Format Cells, page 17
3. Home->Editing->AutoSum, page 24
4. Home->Cells->Format, page 27
5. Home->Cells->Delete, page 29
6. Formulas -> Formula Auditing->Trace Dependents, page 41
7. Formulas -> Formula Auditing->Trace Precedents, page 42
8. Formulas -> Formula Auditing->Show Formulas, page 44
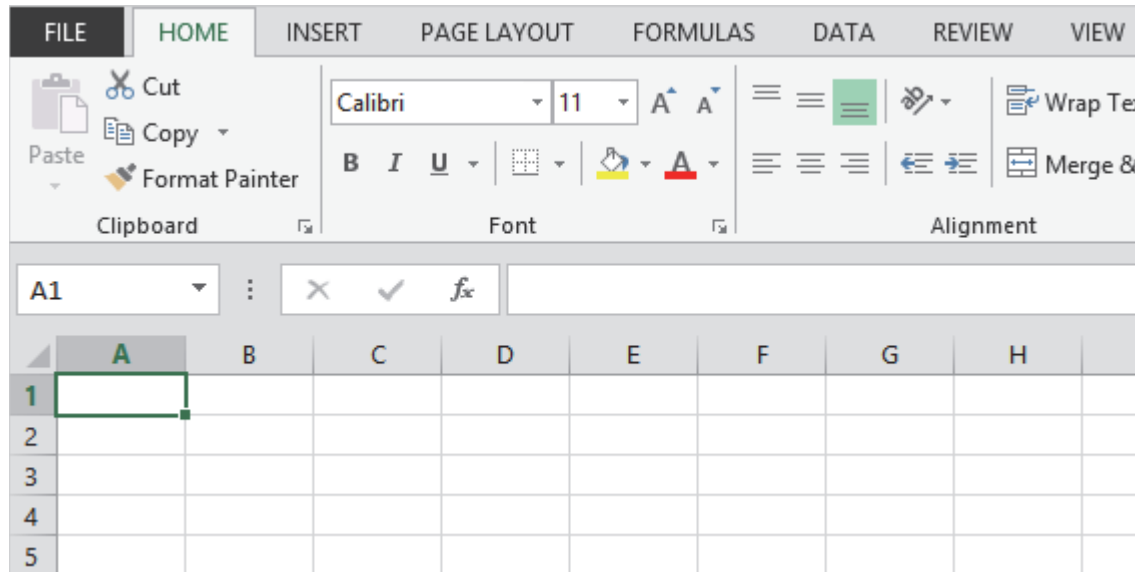9. Formulas -> Formula Auditing->Error Checking, page 46

Take
One
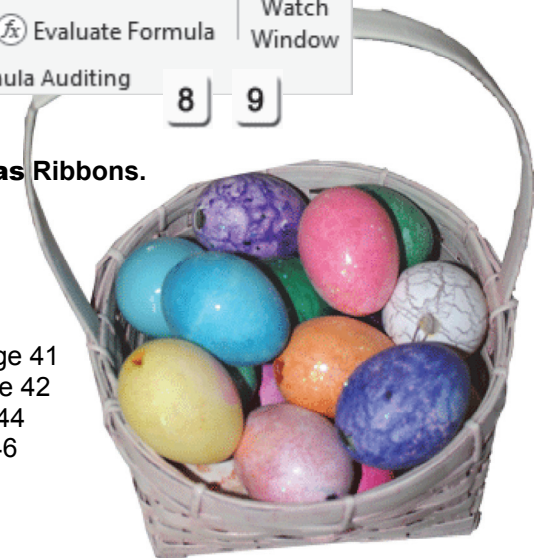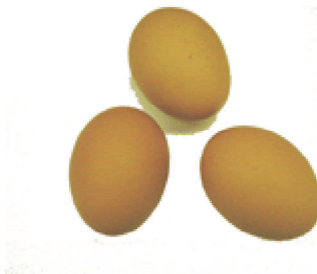
Calculating Sales

Our little online farmer's market is growing. Supply can hardly keep up with demand at Charlotte's Web Site. We're counting the chickens before they are hatched. Is there a way to forecast what we might sell, say Wednesday two weeks from now? Yes, there is. We can set up a spreadsheet that will calculate our sales on any given day.

Start Microsoft Excel. When the Welcome screen appears, open a new, blank workbook.

What do you see from the top of the screen? Is there a **Home** Ribbon? And the **Insert**, **Page Layout, Formulas, Data. Review and View** Ribbons as well? Yes. Then you are ready to get started.

| FILE | HOME | INSERT | PAGE LAYOUT | FORMULAS | DATA | REVIEW | VIEW |

Cut
Copy
Paste
Format Painter
Clipboard

Calibri   11   A A
B I U   A A
Font

Wrap Text
Merge &
Alignment

A1   fx

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								

Take One

Enter the Labels

Hello, Excel. There are only three parts to a spreadsheet: **labels**, **data**, and **formulas**. Start with the labels.
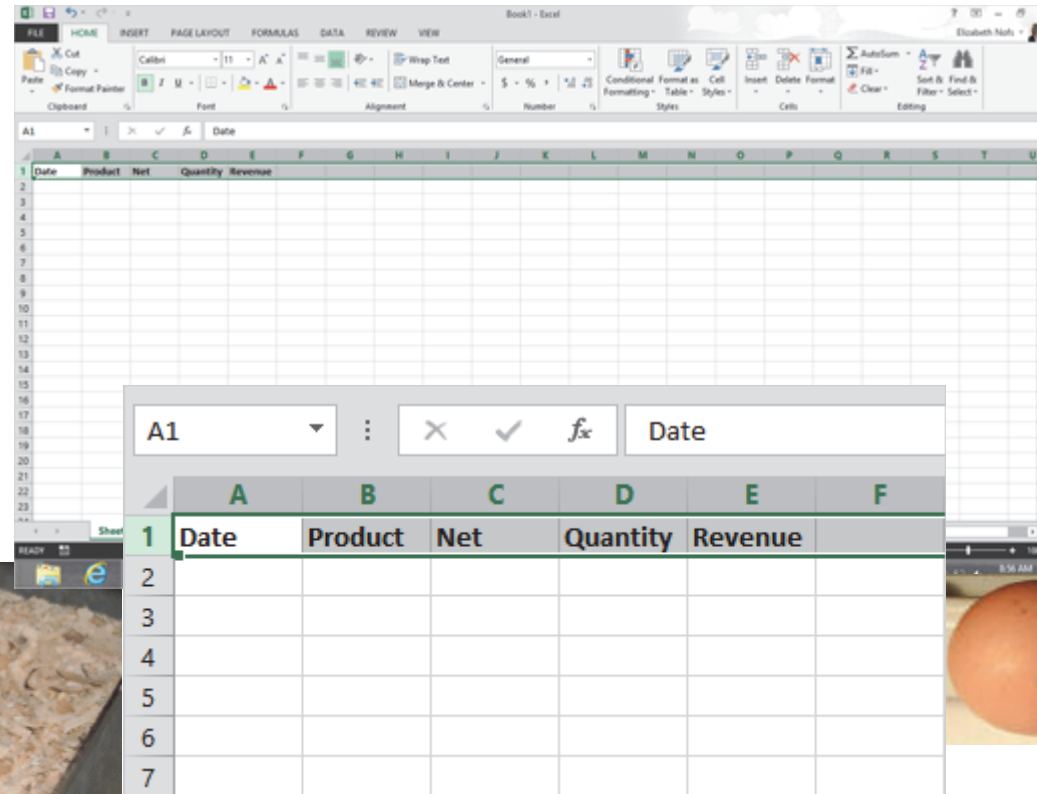
1. Try This: Enter the Labels
Click on Cell A1 and type: Date
In Cell B1 type: Product
In Cell C1 type: Net
In Cell D1 type: Quantity
In Cell E1 type: Revenue

If these are **labels**--and they are--select Row 1 and make them **Bold**.

Keep going...

1

A1	▼	:	✕	✓	f_x	Date	
	A	**B**	**C**	**D**	**E**	**F**	
1	Date	Product	Net	Quantity	Revenue		
2							
3							
4							
5							
6							
7							

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.2 Format Cells and Ranges: Change Font and Font Styles
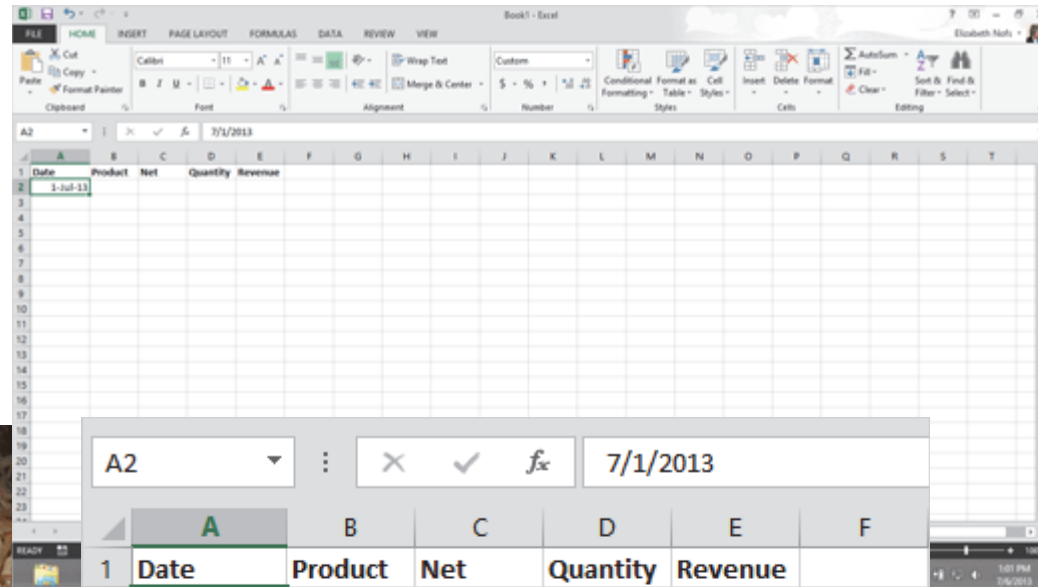
Take One

Enter the Date

2. Try This: Enter the Date
Select Cell A2 and type: July 1, 2013.
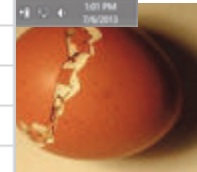Click ENTER on the keyboard.

What Do You See? The date in Cell A2 is displayed as **1-Jul-13.** This is a default date format: d/mm/yy.
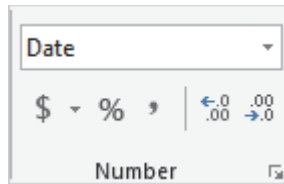
Keep going...

Home -> Number

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.2 Format Cells and Ranges: Apply Number Formats

Take One

Format Date and Time

Many companies work with people from around the world. When you select a format that displays the names of the months, it makes it clear whether 2/1/14 is January 2nd or February 1st. Please format this column for date and time.

3. Try This: Change The Date Format
Select Column A, first.
Go to **Home->Number.**
Go to **Number Format.**
The default number format is **General**.
Select: **Long Date.**

Keep going...

Memo to Self: Column A may resize automatically to fit the date. If you see #### that means the Column is too narrow. Please make the Column wider.

Home -> Number ->Number Format

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.2 Format Cells and Ranges: Apply Number Formats (Date)

Take One

Home -> Number ->Number Format

Format Cells

4. Try This, Too: Find Custom Date Formats
There are additional formats in the Number Group.
These options can be found by clicking on the
Option arrow in the lower right corner.

Date

$ ▾ % , ←.0 .00
.00 →.0
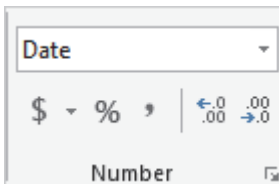
Number

What Do You See? There are several pages of
formatting options.
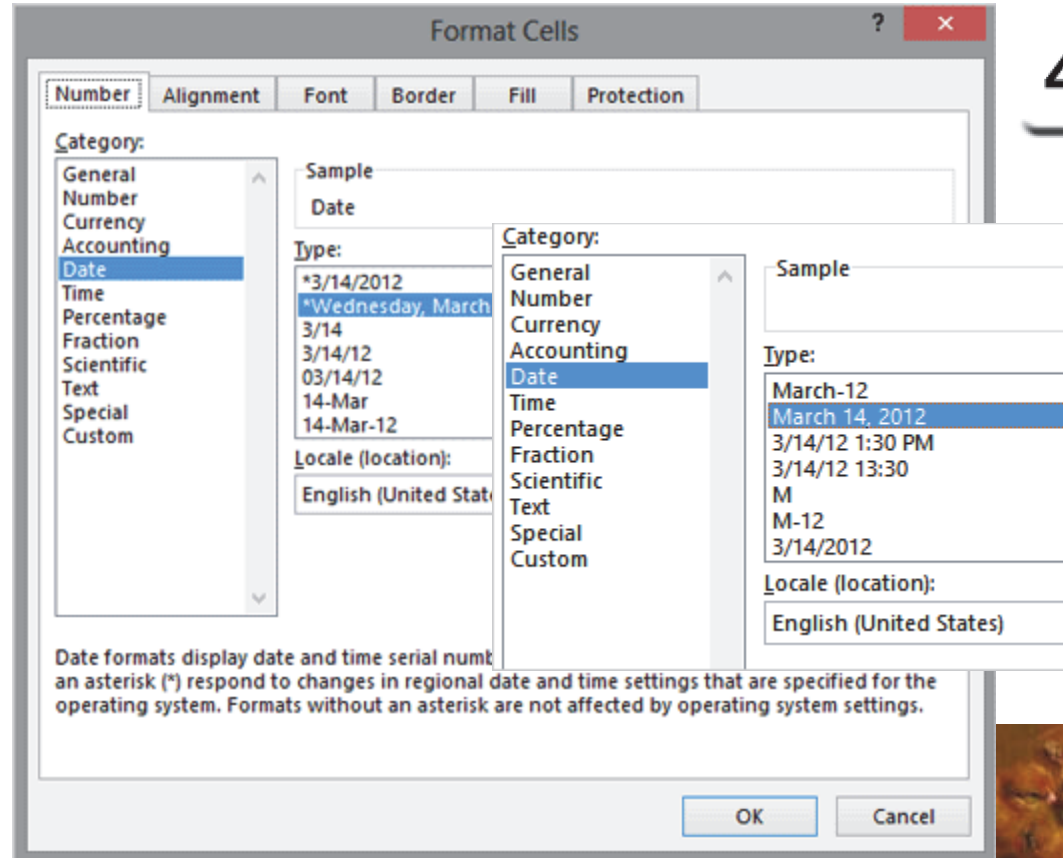Go to the **Number** page and select **Date**
Select a Type: March 14, 2012.
This is a Medium Date Format.
Click **OK**.

Keep going...

.
Memo to Self: You can create a Custom format if
you wish. We will use this option in a different
lesson a few pages down the road.

Format Cells

| Number | Alignment | Font | Border | Fill | Protection |

Category:
- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom

Sample
Date

Type:
- *3/14/2012
- *Wednesday, March
- 3/14
- 3/14/12
- 03/14/12
- 14-Mar
- 14-Mar-12

Locale (location):
English (United States)

Category:
- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom

Sample

Type:
- March-12
- March 14, 2012
- 3/14/12 1:30 PM
- 3/14/12 13:30
- M
- M-12
- 3/14/2012

Locale (location):
English (United States)

Date formats display date and time serial numb
an asterisk (*) respond to changes in regional date and time settings that are specified for the
operating system. Formats without an asterisk are not affected by operating system settings.

OK   Cancel

4

Exam 77-428 Microsoft Excel 2013 EXPERT
2. Apply Custom Formats and Layouts
2.1 Apply Custom Data Formats: Advanced Fill Series Options

Take One

Fill a Series with AutoFill

Now, one way to put in the dates for the next month would be to type them all. Do you want to know a faster way? **AutoFill** is a quick method for filling in data. It is not quite the same as copy and paste.

5. Try This: Use The AutoFill
Please select Cell A2, first.
Look at the bottom right corner of Cell A2.
The AutoFill Handle is a small square. When you run your mouse over the Handle, your mouse will become a thin black cross.

Hold the **AutoFill** handle and drag down to Row 24.

What Do You See? The dates will increment (add another day to each Row) as you Fill Down Cell A2.

Keep going...

Home -> Number ->Format Cells

5

AutoFill Handle

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.1 Insert Data In Cells and Ranges: Autofill

Take One

AutoFill Options

What Else Do You See? Look by the AutoFill handle in Cell A24. There is a little option box that you can click. The **AutoFill Options** are:
Copy Cells
Fill Series
Fill Formatting Only
Fill Without Formatting
Fill Days
Fill Weekdays
Fill Months
Fill Years
Flash Fill

The **Day**, **Month** and **Year** formatting displays only that portion of the date that you entered in the Cells. You can choose to Fill the Cells with or without the Cell **Formatting**, too.

Fill Weekdays looks up the dates in your **Series** and enters only the days from Monday to Friday. No weekends-sweet.
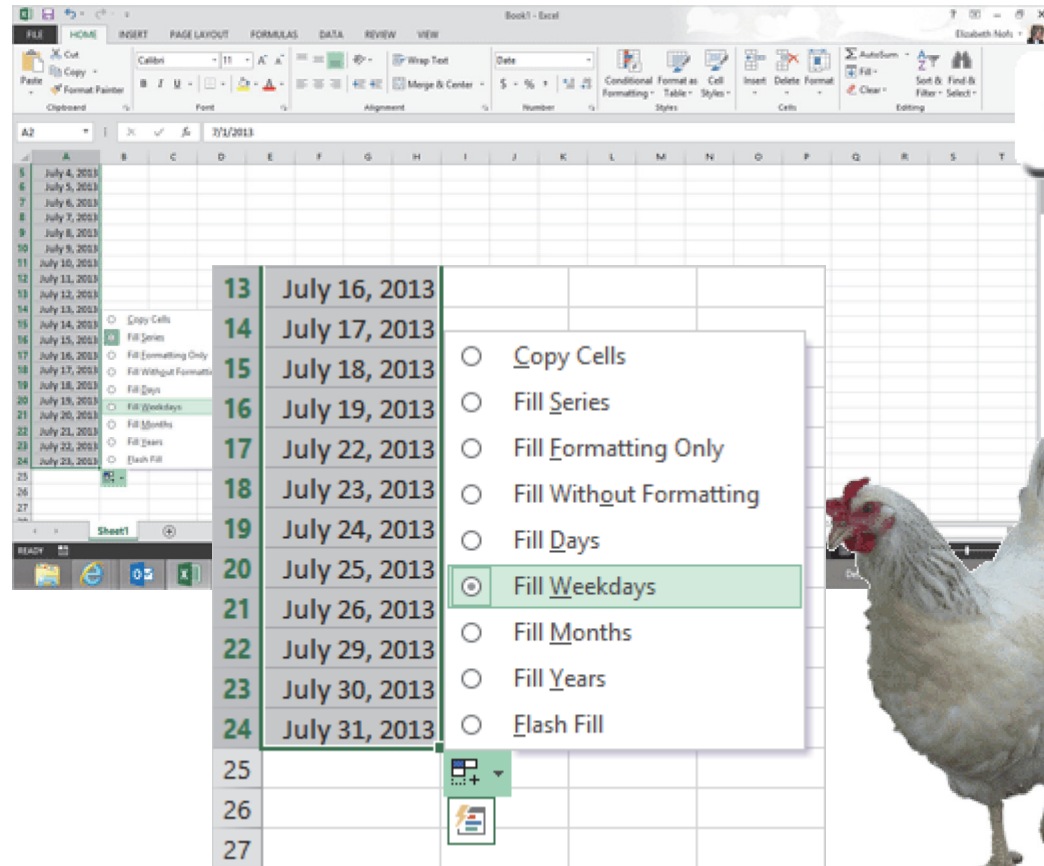
6. Try This, Now: Fill the Weekdays
Click on the **AutoFill Options**.
Select: **Fill Weekdays**.
Keep going...

AutoFill Options

Exam 77-428 Microsoft Excel 2013 EXPERT
2. Apply Custom Formats and Layouts
2.1 Apply Custom Data Format: Use Advanced Fill Series Options

Take One

Copy the Data with AutoFill
Charlotte's Website sells eggs, chicken wings, and little sausages wrapped in pastry. Eggs, Legs, and Pigs in a Basket. **AutoFill** works here, as well.

7. Try This, Too: Copy a Series
Select Cell B2 and type: Eggs.
Now, click once on Cell B2 to select it.
Double click the AutoFill handle on Cell B2.

What Do You See? AutoFill copies the word Eggs and fills all the way down to Row 24.

Look Again: AutoFill copied the data down as far as the column to the left. So don't worry, it won't go on beyond Cell B24.

Keep going...

AutoFill Options

▲	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Eggs				
3	July 2, 2013					
4	July 3, 2013					
5	July 4, 2013					
6	July 5, 2013					
7	July 8, 2013					

AutoFill Handle

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.1 Insert Data In Cells and Ranges: Autofill

Take
One

Edit and Format the Money

Say the net profit on a dozen eggs is $1.50 after shipping and handling. Pretend these are gourmet eggs, sold on the Internet. You don't need to type the dollar sign. We're going to format the Column for currency.

8. Try This: Enter the Data
Select Cell C2 and type: 1.50.

Try This, Too: Format the Cells
Select Column C.
Go to **Home->Number.**
Select **Accounting** (dollar sign) from the Number Formats. Accounting formats the Cells so the dollars and cents line up.
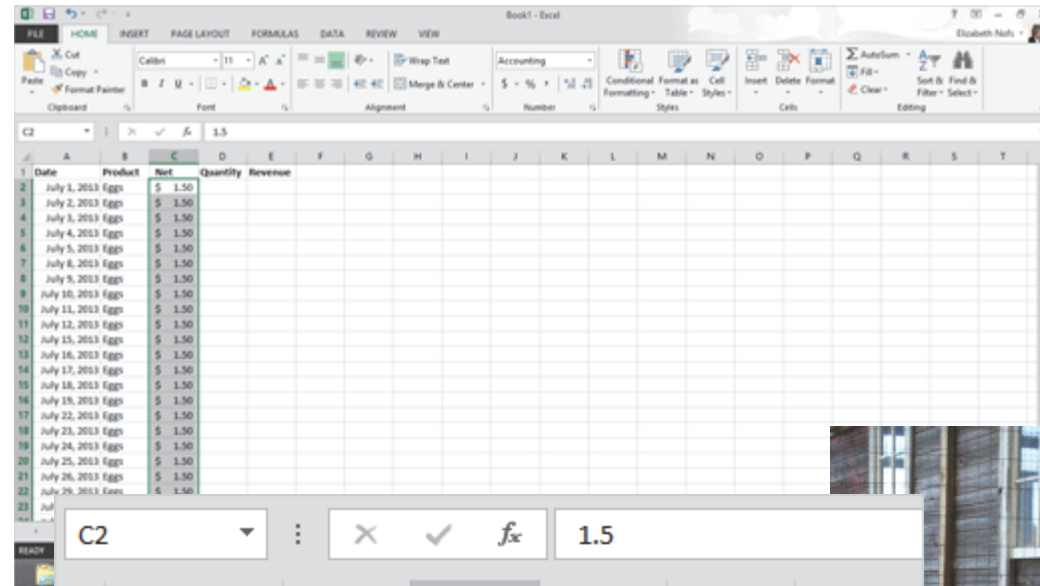
And Try This: AutoFill the Data
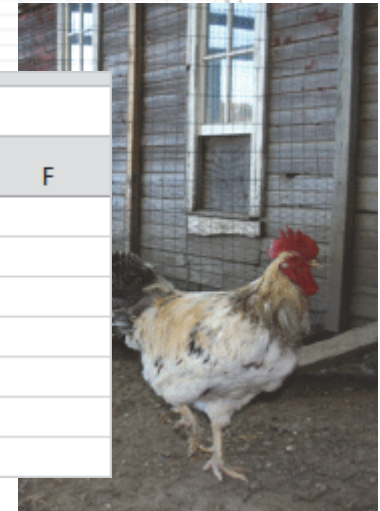Select Cell C3 and AutoFill the $1.50 by double clicking on the little square handle.

What Do You See? The money should be copied all the way down to Cell C24.

Keep going, please...

8

C2		fx	1.5		
	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Eggs	$ 1.50			
3	July 2, 2013	Eggs	$ 1.50			
4	July 3, 2013	Eggs	$ 1.50			
5	July 4, 2013	Eggs	$ 1.50			
6	July 5, 2013	Eggs	$ 1.50			
7	July 8, 2013	Eggs	$ 1.50			

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.2 Format Cells and Ranges: Apply Number Formats

Take One

AutoFill a Series

This little web site sells about 100 egg baskets a day. Suppose we sold another 5 baskets every day. What would the sales revenue be?

9. Try This: Enter the Data
In Cell D2 type 100.
In Cell D3 type 105.

And Do This: AutoFill a Series
Select Cell D2 AND D3: both the 100 and the 105. Now you have selected enough of a **Range** for Excel to recognize that this is a **Series**, incrementing by 5s.

Double click the **AutoFill** handle and the **Series** will fill down to match Column C on the left.

What Do You See? When you **AutoFill** this Series, Microsoft Excel adds 5 more to the quantity in each Row.

AutoFill Options

9
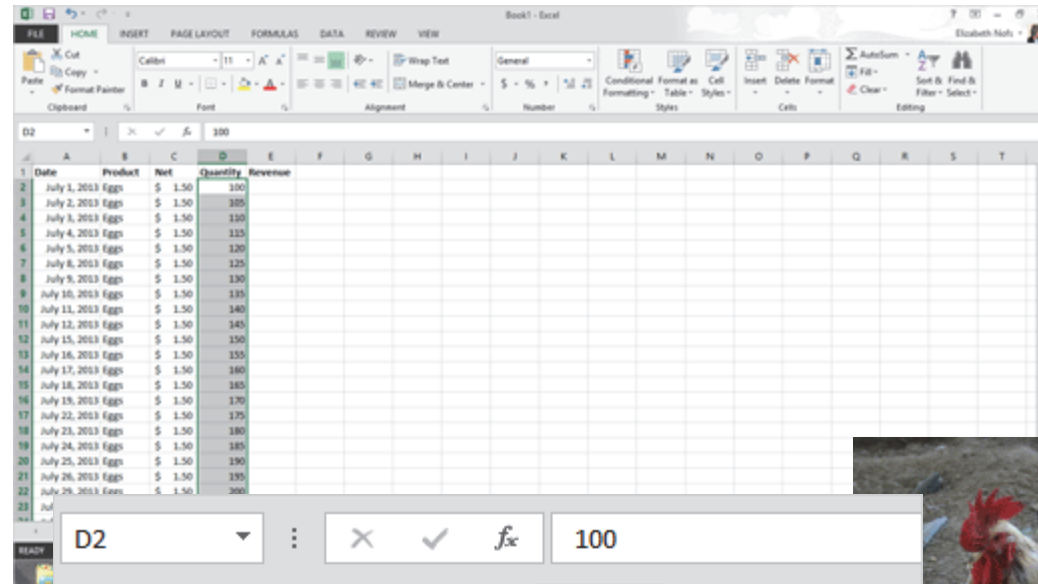
	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Eggs	$ 1.50	100		
3	July 2, 2013	Eggs	$ 1.50	105		
4	July 3, 2013	Eggs	$ 1.50			
5	July 4, 2013	Eggs	$ 1.50		115	
6	July 5, 2013	Eggs	$ 1.50			
7	July 8, 2013	Eggs	$ 1.50			

Exam 77-420 Microsoft Excel 2013
2. Create Cells and Ranges
2.1 Insert Data In Cells and Ranges: Autofill

Take One

Calculate Revenue

Labels and Data. Now all we need are the formulas. Think about the math: revenue equals net times quantity.
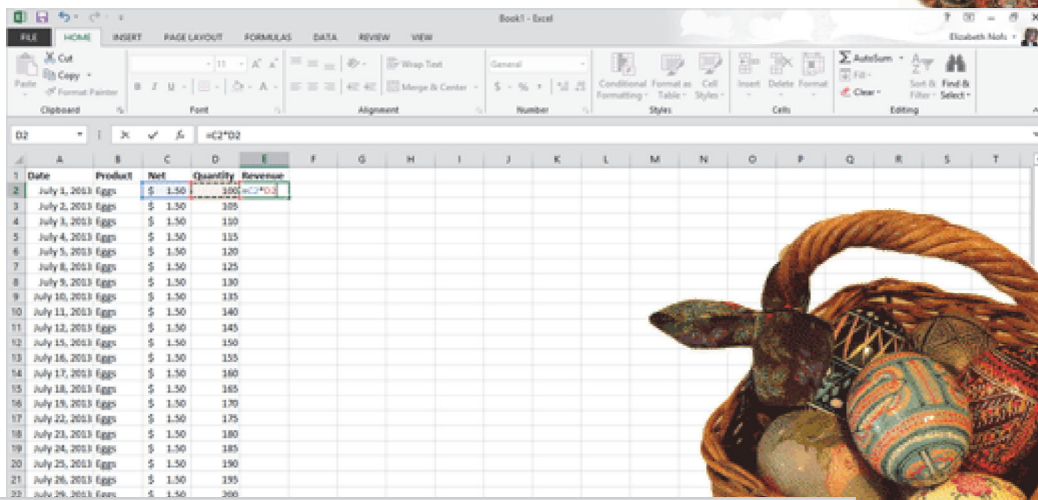
Try This: Create a Formula
Select Cell E2 and type in the equal sign.
All good equations begin with "=."
Select Cell C2—the Net is $1.50.
Type the times symbol (the asterisk key).
Select Cell D2—the Quantity is 100.

The completed equation is =C2*D2

Hit the **Enter** key on your keyboard. Excel won't calculate until you leave the Cell.

What Do You See? There it is. $1.50 times 100 equals $150.00. OK, go to Cell E2 and double click on the **AutoFill** handle to fill in the equations.

Keep going, please...

	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Eggs	$ 1.50	100	=C2*D2	
3	July 2, 2013	Eggs	$ 1.50	105		
4	July 3, 2013	Eggs	$ 1.50	110		
5	July 4, 2013	Eggs	$ 1.50	115		
6	July 5, 2013	Eggs	$ 1.50	120		
7	July 8, 2013	Eggs	$ 1.50	125		

D2 — fx =C2*D2

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.2 Summarize Data with Functions: Calculate Revenue

Take One

AutoSum the Total Sales

What is the sum of all the products sold? Here are the steps to calculate the total sales.

Try it: AutoSum the Revenue
Select Cell E25
Go to **Home ->Editing->AutoSum.**

Excel will enter the formula:
=SUM(E2:E24)

Click ENTER on your keyboard.

What Do You See? In the example on this page the Sum is $5,347.50.

22	July 29, 2013 Eggs	$ 1.50	200	$ 300.00
23	July 30, 2013 Eggs	$ 1.50	205	$ 307.50
24	July 31, 2013 Eggs	$ 1.50	210	$ 315.00
25				=SUM(E2:E24)
26				SUM(**number1**, [number2], ...)
27				

21	July 26, 2013 Eggs	$ 1.50	195	$ 292.50
22	July 29, 2013 Eggs	$ 1.50	200	$ 300.00
23	July 30, 2013 Eggs	$ 1.50	205	$ 307.50
24	July 31, 2013 Eggs	$ 1.50	210	$ 315.00
25				$5,347.50
26				

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.2 Summarize Data with Functions: SUM

Take One

Copy the Spreadsheet

OK, that takes care of the eggs. Let's name the spreadsheet and move on.

1. Rename the Spreadsheet
Double click the Sheet1 tab.
Type: Eggs

2. Copy the Spreadsheet
Right mouse click the "Eggs" label.
Select **Move or Copy.**

3. Check Create a copy.
Click **OK** to close the Move or Copy window.

4. What Do You See? There should be a new sheet called Eggs (2).

Memo to Self: This method copied everything: labels, data, and formulas. Saves time, doesn't it?

19	July 24, 2013	Eggs	$ 1.50
20	July 25, 2013	E
21	July 26, 2013	E
22	July 29, 2013	E
23	July 30, 2013	E
24	July 31, 2013	E
25		
26		
27		
28		
29		
30		

Insert...
Delete
Rename
Move or Copy...   **2**
View Code
Protect Sh
Tab Colo
Hide
Unhide...
Select All

Eggs   Sheet2

1

16	July 19, 2013	E	$ 1.50	170	$355.00
17	July 22,
18	July 23,
19	July 24,
20	July 25,
21	July 26,
22	July 29,
23	July 30,
24	July 31,
25	
26	
27	
28	
29	

Move or Copy   ?   ✕

Move selected sheets
To book:
Book1

Before sheet:

Eggs
Sheet2
(move to end)

3

☑ Create a copy

OK   Cancel

28		
29		
30		

◄ ►   **Eggs (2)**   Eggs   Sheet2   ⊕

4   ►   **Eggs**   Sheet2   ⊕

Exam 77-420 Microsoft Excel 2013
1. Create and Manage Worksheets and Workbooks
1.1 Create Worksheets and Workbooks: Copy and Move Worksheets

Intermediate Microsoft Excel 2013   Page 25 of 245

Take One

Change the Variables

Next Step: Change a few variables, please.

Rename the Spreadsheet
Double click on the tab for Eggs (2).
Rename this spreadsheet: Legs.

Update the product data
Go to Cell B2 and change Eggs to Legs.
AutoFill Cell B2 to the bottom of Column B.

Change the Net
The net for chicken legs is 3.25.
Enter that amount and AutoFill.

Change the Quantity
The quantity starts at 50 and adds 5 per day.
In Cell D2 type: 50.
In Cell D3 type: 55.
Select D2 and D3 and AutoFill.

The work on the Pig's page is similar. Copy the Eggs sheet. Rename the new Eggs(2) sheet to Pigs. Change the product to Pigs.

The Net is 4.75 and the quantity starts at 200 but only adds one more per day.
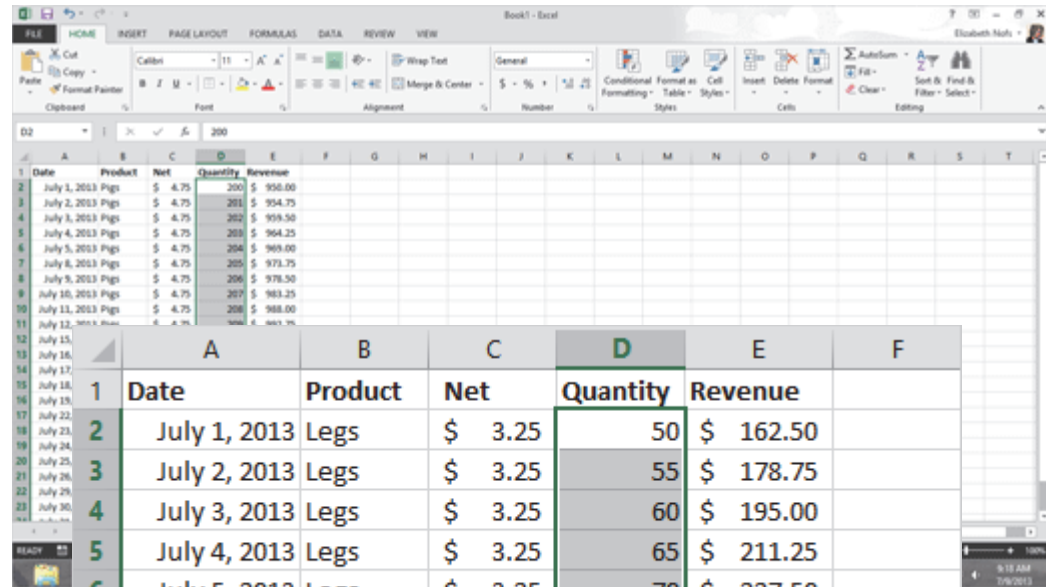
	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Legs	$ 3.25	50	$ 162.50	
3	July 2, 2013	Legs	$ 3.25	55	$ 178.75	
4	July 3, 2013	Legs	$ 3.25	60	$ 195.00	
5	July 4, 2013	Legs	$ 3.25	65	$ 211.25	
6	July 5, 2013	Legs	$ 3.25	70	$ 227.50	
7	July 8, 2013	Legs	$ 3.25	75	$ 243.75	

	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Pigs	$ 4.75	200	$ 950.00	
3	July 2, 2013	Pigs	$ 4.75	201	$ 954.75	
4	July 3, 2013	Pigs	$ 4.75	202	$ 959.50	
5	July 4, 2013	Pigs	$ 4.75	203	$ 964.25	
6	July 5, 2013	Pigs	$ 4.75	204	$ 969.00	
7	July 8, 2013	Pigs	$ 4.75	205	$ 973.75	

Take One

Home ->Cells ->Format ->AutoFit Column Width

AutoFit the Columns

What Do You See? Column E may display #####. Why are there pound signs? That's Excel's way of saying that the column is too narrow.

The Computer Mama sez that means you have too much money.

Try it: Format the Column Width
Select Column E.
Go to **Home->Cells-> Format**.
Select **AutoFit Column Width**.

Here's another way:
Place your cursor between the E and F Column header—right on the line. Your cursor will change from a white plus sign to a black double-headed arrow. Double click and Column E will be resized as wide as it needs to be.

21	July 26, 2013	Pigs	$ 4.75	219	#######
22	July 29, 2013	Pigs	$ 4.75	220	#######
23	July 30, 2013	Pigs	$ 4.75	221	#######
24	July 31, 2013	Pigs	$ 4.75	222	#######
25					#######
26					

Exam 77-420 Microsoft Excel 2013
1. Create and Manage Worksheets and Workbooks
1.3 Format Worksheets and Workbooks: Adjust Row Height and Column Width

Take One

Create a Summary Sheet

1. Make a copy of the "Eggs" spreadsheet
Right Click the Eggs Tab.
Select **Move or Copy.**
When the little Options window pops up,
Check to Create a copy.

2. Rename the Spreadsheet
Double click the tab.
Type: Summary

3. Edit the Data
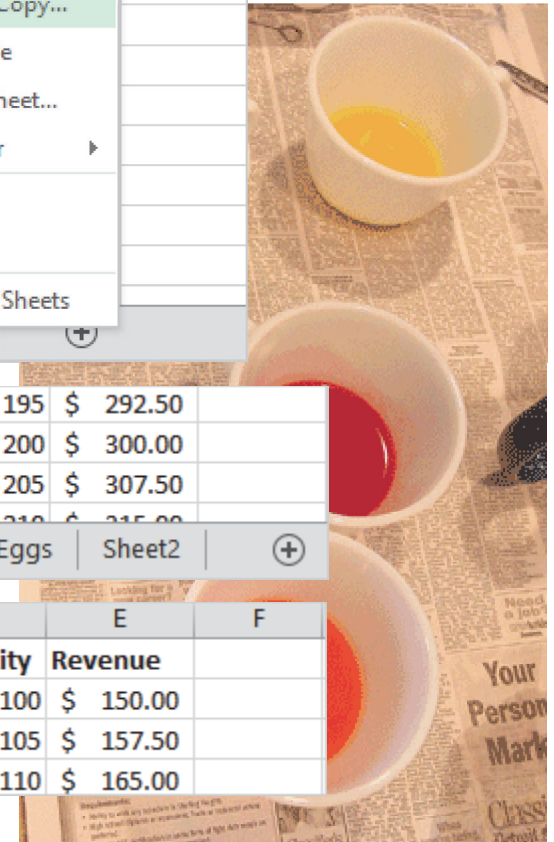Select Cell B2 and type: All Products.
AutoFill Cell B2.

Keep going, please...

1

12	July 15, 2013	Eggs	$ 1.50	150 $ 225.00
13	July 16, 2013	Eggs	$ 1.50	
14	July 17, 2013	Eggs	$ 1.50	
15	July 18, 2013	Eggs	$ 1.50	
16	July 19, 2013	Eggs	$ 1.50	
17	July 22, 2013	Eggs	$ 1.50	
18	July 23, 2013	Eggs	$ 1.50	
19	July 24, 2013	Eggs	$ 1.50	
20	July 25, 2013	Eggs	$ 1.50	
21	July 26, 2013	Eggs	$ 1.50	
22	July 29, 2013	Eggs	$ 1.50	
23	July 30	ggs	$ 1.50	

Insert...
Delete
Rename
Move or Copy...
View Code
Protect Sheet...
Tab Color ▶
Hide
Unhide...
Select All Sheets

js | Legs | **Eggs** | Sheet2 | ⊕

2

21	July 26, 2013	All Products	$ 1.50	195 $ 292.50
22	July 29, 2013	All Products	$ 1.50	200 $ 300.00
23	July 30, 2013	All Products	1.50	205 $ 307.50

◀ ▶ | **Summary** | Pigs | Legs | Eggs | Sheet2 | ⊕

3

	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	All Products	$ 1.50	100	$ 150.00	
3	July 2, 2013	All Products	$ 1.50	105	$ 157.50	
4	July 3, 2013	All Products	$ 1.50	110	$ 165.00	

Exam 77-420 Microsoft Excel 2013
1. Create and Manage Worksheets and Workbooks
1.1 Create Worksheets and Workbooks: Copy and Move Worksheets

Create a Summary Sheet, cont.

4. Delete Column C and D
Select Column C and D.
Go to **Home->Cells->Delete**.
Click on **Delete Sheet Columns**.

What Do You See? The equations in the Revenue column now read: #REF!. The equation doesn't have the data for Net and Quantity anymore. It has nothing to reference, hence the error message.

Go ahead: select those cells and hit the delete key to clear the busted equations.

The Grand Total, cont.

This equation will link the Summary sheet to each of the product sheets: Legs, Eggs, and Pigs.

Try it: Create reference links
1. Start on the **Summary** Sheet
Select Cell C2 type: =.
All good equations begin with "="

2. Go to the **Legs** sheet
Select Cell E2.
Type + (to add the next variable)

3. Go to the **Eggs** sheet
Select Cell E2.
Type + (to add the next variable)

Keep going, please...

1

IF			fx	=

	A	B	C	D	E
1	Date	Product	Revenue		
2	July 1, 2013	All Products	=		
3	July 2, 2013	All Products			

2

E2			fx	=Legs!E2

	A	B	C	D	E
1	Date	Product	Net	Quantity	Revenue
2	July 1, 2013	Legs	$ 3.25	50	$ 162.50
3	July 2, 2013	Legs	$ 3.25	55	$ 178.75

3

E2			fx	=Legs!E2+Eggs!E2

	A	B	C	D	E
1	Date	Product	Net	Quantity	Revenue
2	July 1, 2013	Eggs	$ 1.50	100	$ 150.00
3	July 2, 2013	Eggs	$ 1.50	105	$ 157.50
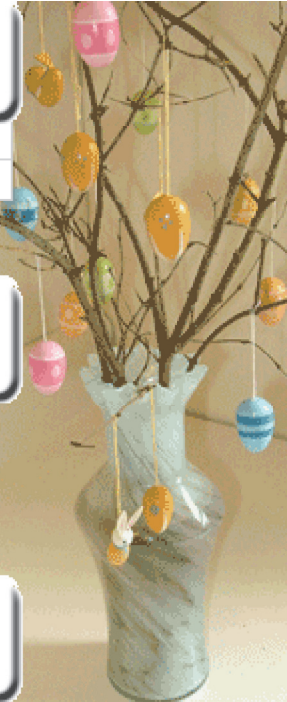
Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References In Formulas and Functions: Reference Cell Ranges in Formulas

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Take One

The Grand Total, cont.

4. Lastly, go to the **Pigs** sheet
Select Cell E2
Hit Enter on your keyboard...

5. You will be taken back to Cell C2 in the Summary spreadsheet.

6. **AutoFill** this equation and you've got a formula that adds all of the sales for each product. Well done.

What Do You See? The formula says:
=Spreadsheet!Cell
where Legs, Eggs, and Pigs are the names of our spreadsheets.

We linked several spreadsheets together to Sum up sales in one place.

Way cool. This is a good place for a **Cookie Break**. Save your work and take a few minutes off.

4

E2		⋮	✕	✓	*fx*	=Legs!E2+Eggs!E2+Pigs!E2

	A	B	C	D	E	F
1	Date	Product	Net	Quantity	Revenue	
2	July 1, 2013	Pigs	$ 4.75	200	$ 950.00	
3	July 2, 2013	Pigs	$ 4.75	201	$ 954.75	

5

C2		⋮	✕	✓	*fx*	=Legs!E2+Eggs!E2+Pigs!E2

	A	B	C	D	E	F
1	Date	Product	Revenue			
2	July 1, 2013	All Products	$1,262.50			
3	July 2, 2013	All Products	$1,291.00			
23	July 30, 2013	All Products	$ 1,861.00			
24	July 31, 2013	All Products	$ 1,889.50			
25			$36,248.00			
26						
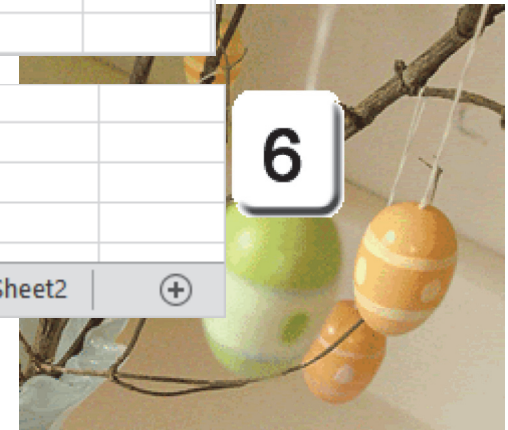
6

◄ ► **Summary** | Legs | Eggs | Pigs | Sheet2 | ⊕

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References In Formulas and Functions: Reference Cell Ranges in Formulas

Cell References

When you created the sales spreadsheet, you selected a **range of cells** to **AutoFill**. If we put 100 for the quantity in the first cell and 105 in the next, Excel fills down the series and adds 5 more to each cell. If you wanted a different forecast you could enter new quantities in the first and second cells and use the AutoFill again. This could get old very fast. It is also a rather inflexible method of changing the data. There is a better method: **reference cells**. Reference cells set up one place to enter the data. All of the other equations and spreadsheets that depend on that data look it up in the reference cells.

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References In Formulas and Functions: Reference Cell Ranges in Formulas

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Home->Cells ->Insert

Create the Reference Cells

Before You Begin: Go to the Pigs sheet.
Please select Row 1 and **Insert** four more
Rows. This will give us room to work.

1. Try This: Enter the Labels
In Cell A1 type: Price
In Cell A2 type: Start
In Cell A3 type: Increment

If these are Labels (yep, they are) then select
Cells A1:A3 and format the Font Bold.
Go to **Home->Font->Bold**.

OK, Now Try This: Enter the Data
n Cell B1 type: 3.25.
Format Cell B1 for Accounting.

Keep going, please...

Memo to Self: This lesson continues with the
Legs Eggs and Pigs.xlsx spreadsheet

Exam 77-420 Microsoft Excel 2013
1. Create and Manage Worksheets and Workbooks
1.3 Format Worksheets and Workbooks: Insert and Delete Columns and Rows

Take One

Create a Relative Reference

2. Try This, Too: Create a Relative Reference
All good equations begin with "equals."
Select Cell C6 and type: =
Click on Cell B1.
Type: ENTER on the keyboard.

What Do You See? The formula in Cell C6 says that C6 equals B1. If you change the number in Cell B1, it should automatically update in Cell C6.

Test Your Formula: Change the Data
Select Cell B1 and type: 4.75
Type: ENTER on the keyboard.
Select Cell B1 and type: 3.25
Type: ENTER on the keyboard.

What Else Do You See? The number in Cell C6 should update as soon as you hit the ENTER key.

The other Cells in Column C will NOT update at this time: those Cells do not have a formula, yet.

Keep going...

B1		:	×	✓	fx	=B1	
	A		B		C	D	E	F

	A	B	C	D	E	F
1	Price	3.25				
2	Start					
3	Increment					
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	=B1	200	$ 950.00	
7	July 2, 2013	Pigs	$ 4.75	201	$ 954.75	
8	July 3, 2013	Pigs	$ 4.75	202	$ 959.50	

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References In Formulas and Functions: Use References (Relative, Mixed, Absolute)

Autofill a Relative Reference

In the previous page we created an equation in Cell C6 and tested it. Please **Autofill** that equation to all of the dates in Column C.

3. Try This: Autofill a Relative Reference
Select Cell C6. Double Click the **AutoFill** handle in the lower right corner of the Cell.

What Do You See? The formula in Cell C6 will be copied to all of the dates in Column C. However, instead of copying $3.25, the price in Cell B1, Cell C10 says "Product" and Cell C11 says "Pigs."

What Else Do You See? The numbers in Column E also indicate a problem. The first equation in Cell E6 calculates correctly.

#VALUE means the data doesn't make any sense: there may be a **mismatch**. In this example, Excel can't multiply Pigs*205 (**Text** times a **Number**).

Keep going...

	A	B	C	D	E	F
1	Price	3.25				
2	Start					
3	Increment					
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	200	$ 650.00	
7	July 2, 2013	Pigs	$ -	201	$ -	
8	July 3, 2013	Pigs	$ -	202	$ -	
9	July 4, 2013	Pigs	$ -	203	$ -	
10	July 5, 2013	Pigs	Product	204	#VALUE!	

C6 =B1

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References in Formulas and Functions: Use References (Relative, Mixed, Absolute)

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Review the Relative References

You can double click any Cell that has a formula and see an outline of the Cell (s) that are used in that equation.

Let's **audit** this spreadsheet.

4. Try This: Audit a Relative Reference
Double Click Cell C6. You should see the formula displayed in the Formula Bar at the top of the spreadsheet. Cell B1 is outlined in Blue.

Double Click Cell C10. Cell B5 is outlined.

What Does That Mean? The formula in Cell C6 was =B1.
Instead of copying $3.25, the formula (=B1) was AutoFilled.

What Else Do You See? When the formula in Cell C6 was AutoFilled, the Cell Reference was updated for each Row.

This is an example of a **Relative Cell Reference.** It is Relative because it was updated for each Row.

Keep going...

4

| IF | fx | =B1 |

	A	B	C	D	E	F
1	Price	3.25				
2	Start					
3	Increment					
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	=B1	200	$ 650.00	
7	July 2, 2013	Pigs	$ -	201	$ -	

| IF | fx | =B5 |

	A	B	C	D	E	F
1	Price	3.25				
2	Start					
3	Increment					
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	200	$ 650.00	
7	July 2, 2013	Pigs	$ -	201	$ -	
8	July 3, 2013	Pigs	$ -	202	$ -	
9	July 4, 2013	Pigs	$ -	203	$ -	
10	July 5, 2013	Pigs	=B5	204	#VALUE!	
11	July 8, 2013	Pigs	Pigs	205	#VALUE!	

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References in Formulas and Functions: Use References (Relative, Mixed, Absolute)

Create an Absolute Reference

There is another way to manage copying formulas so that they point to the right data.

An **Absolute Reference** is defined as a specific Row or Column. The Absolute Reference will NOT update if it is copied to another Row with Autofill.

5. Try This: Create an Absolute Reference
Select Cell C6.
Click your cursor in the Formula Bar on B1.
On your keyboard, click on F4.

What Do You See? The formula in Cell C6 is now: =$B$1, where the dollar $ sign means that it is Absolute.

Try This Too: AutoFill the Absolute Reference
Select Cell C6.
Double click the Autofill handle.

It looks like it worked this time.

Keep going...

	A	B	C	D	E	F
	IF		fx	=$B$1		
1	Price	3.25				
2	Start					
3	Increment					
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	=$B$1	200	$ 650.00	
7	July 2, 2013	Pigs	$ 3.25	201	$ 653.25	

25	July 26, 2013	Pigs	$ 3.25	219	$ 711.75	
26	July 29, 2013	Pigs	$ 3.25	220	$ 715.00	
27	July 30, 2013	Pigs	$ 3.25	221	$ 718.25	
28	July 31, 2013	Pigs	=$B$1	222	$ 721.50	
29					$15,772.25	

Summary | Legs | Eggs | **Pigs** | Sheet2

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References in Formulas and Functions: Use References (Relative, Mixed, Absolute)

Take One

Using Reference Cells

The next task is to calculate the daily sales. In this example, we will make one Cell Reference in the formula Relative and the other Absolute.

Before You Begin: Edit the Data
In Cell B2 type: 100
In Cell B3 type: 5

Thoughts to Consider
Cell D6 is the initial quantity sold.
Cell D7 should be whatever we sold on the first day, plus the quantity we are forecasting for each day's sales increment.

6. Try it: Create the Formulas
Select Cell D6 and enter this equation:
 =B2

Select Cell D7, and enter this equation:
 =D6 +B3

Try This, Too: AutoFill the Formula
Select **Cell D7** and double click the **AutoFill** handle to fill down the formula. Keep going...

6

B2 f_x =B2

	A	B	C	D	E
1	Price	3.25			
2	Start	100			
3	Increment	5			
4					
5	Date	Product	Net	Quantity	Revenue
6	July 1, 2013	Pigs	$ 3.25	=B2	$ 650.00
7	July 2, 2013	Pigs	$ 3.25	201	$ 653.25

D7 f_x =D6+B3

	A	B	C	D	E	F
1	Price	3.25				
2	Start	100				
3	Increment	5				
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	=D6+B3	$ 653.25	
8	July 3, 2013	Pigs	$ 3.25	202	$ 656.50	

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References in Formulas and Functions: Use References (Relative, Mixed, Absolute)

Troubleshoot the Formulas

7. What Do You See? The **#Value!** means that there is an error. Please audit the spreadsheet. Double click on **Cell D9.** Excel highlights the cells in this formula: =D8+B5

How Did That Happen? Part of the formula is still correct. It equals yesterday's sales—the Cell above—and adds to it.

Most formulas automatically use **Relative References**. A Relative Reference adjusts the the cell references when you copy or fill it down.

In our example, **=D8+B5** becomes **=D9+B6** in the next Row down.

In **Cell D9**, the formula adds a number to a label. Hence, the error **#Value!**

7

IF ✕ ✓ *fx* =D8+B5

	A	B	C	D	E	F
1	Price		3.25			
2	Start		100			
3	Increment		5			
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	
8	July 3, 2013	Pigs	$ 3.25	105	$ 341.25	
9	July 4, 2013	Pigs	$ 3.25	=D8+B5	#VALUE!	
10	July 5, 2013	Pigs	$ 3.25	#VALUE!	#VALUE!	

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References In Formulas and Functions: Troubleshoot a formula

Take One

Absolute References

When you need to work with one particular cell you need an **Absolute Reference**.

8. Try it: Create an Absolute Reference
Select **Cell D7**.
The Formula bar shows =D6+B3.
Go to the Formula Bar and click on B3.
Click the **F4 function key** on the top row of the keyboard.

What Do You See? The cell reference becomes $B$3. This means "go to B3 only, and no place else," to get the data.

Try This, Too: AutoFill the Formula
Select **Cell D7** and **AutoFill** the revised equation to the rest of the rows.

A **Mixed Reference** uses Absolute and Relative cell references.
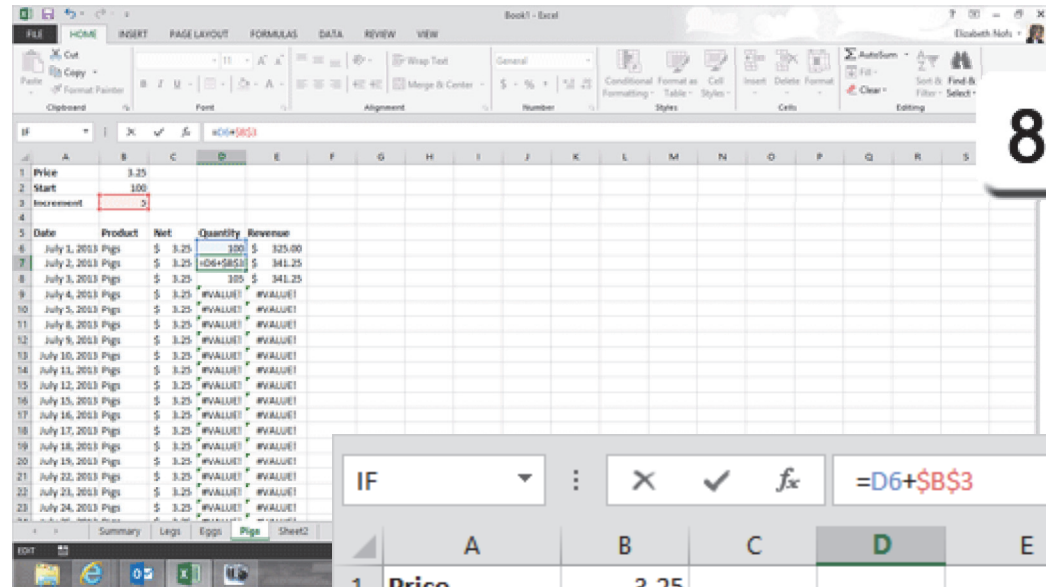
IF | × ✓ fx | =D6+$B$3

	A	B	C	D	E
1	Price	3.25			
2	Start	100			
3	Increment	5			
4					
5	Date	Product	Net	Quantity	Revenue
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00
7	July 2, 2013	Pigs	$ 3.25	=D6+$B$3	$ 341.25
8	July 3, 2013	Pigs	$ 3.25	105	$ 341.25
9	July 4, 2013	Pigs	$ 3.25	#VALUE!	#VALUE!
10	July 5, 2013	Pigs	$ 3.25	#VALUE!	#VALUE!

Exam 77-420 Microsoft Excel 2013
4. Apply Formulas and Functions
4.1 Apply Cell Ranges and References in Formulas and Functions: Troubleshoot a formula

Formulas -> Formula Auditing->Trace Dependents

Audit Your Work

You can double click on a cell to **trace** the references in the formula. Here is a better way to audit your spreadsheet.

1. Try This: Trace the Dependants
Select Cell B3.
Go to **Formulas->Formula Auditing.**
Click on **Trace Dependents**.

What Do You See? There are some useful tools for **Formula Auditing**:

Trace Precedents
Finds the cells that have an affect on the cell you selected

Trace Dependents
Locates the formulas that use this cell in their equations

Remove Arrows

Keep going...

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Troubleshoot With Tracing (Trace Dependents)

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Take One

Formula Auditing

2. Try it: Trace Precedents
Select Cell E29.
Go to **Formulas->Formula Auditing.**
Click **Trace Precedents.** You will see an arrow from Cell E6 to Cell E29.

Click **Trace Precedents** again.
You should see arrows in each Row that trace the formulas.

Click **Trace Precedents** a third time.
You will see a call out to each variable in Cells B1, B2 and B3.

Please click on **Remove Arrows** to take off the tracings.

Formulas -> Formula Auditing->Trace Precedents

Trace Precedents   Show Formulas
Trace Dependents   Error Checking
Remove Arrows   Evaluate Formula

Formula Auditing

	A	B	C	D	E	F
1	Price	3.25				
2	Start	100				
3	Increment	5				
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	

	A	B	C	D	E	F
1	Price	3.25				
2	Start	100				
3	Increment	5				
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Troubleshoot With Tracing (Trace Precendents)

Take One

Formulas -> Formula Auditing->Trace Precedents

Tracing Errors

What Does an Error Look Like? Here is a simple example we can try.

Before You Begin: Set Up a Mistake
Select **Cell E8** and type: 360
Now Cell E8 does NOT have a formula. Yet, how would you know?

3 Try This: Trace the Precedents
Select Cell E29.
Go to **Formulas->Formula Auditing.**
Click **Trace Precedents.** You will see an arrow from Cell E6 to Cell E29.

Click **Trace Precedents** again.

What Do You See? You should see arrows in each Row that trace the formulas. You should see a "gap" in the tracings. This gap indicates that there is no formula in Cell E8.

Keep going....

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Troubleshoot With Tracing (Trace Errors)

Show Formulas

Formulas -> Formula Auditing->Show Formulas

Sometimes, it helps to looooook at the formulas. Here are the steps:

Before You Begin: Remove the arrows

4. Try it: Show Formulas
Select Cell E8.
Go to **Formulas->Formula Auditing.**
Click **Show Formulas.**

What Do You See? All of the cells that have formulas are displayed. Cell E8 has a number that we typed in earlier in this lesson: no formula.

You can click on **Show Formulas**, again, to turn off the formulas display.

Net	Quantity	Revenue
=$B$1	=B2	=C6*D6
=$B$1	=D6+$B$3	=C7*D7
=$B$1	=D7+$B$3	360
=$B$1	=D8+$B$3	=C9*D9
=$B$1	=D9+$B$3	=C10*D10
=$B$1	=D10+$B$3	=C11*D11
=$B$1	=D11+$B$3	=C12*D12

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Troubleshoot With Tracing (Show Formulas)

Take One

Error Checking

Error Checking works like Spell Checking. Errors can be marked and corrected one at a time, or Live, as you work on your formulas.

1. Before You Begin: Make a Mistake
Select Cell E8.
Enter this formula: =C7*D8.

What Do You See? This formula does NOT match the formula above or below it. So, Cell E8 has a error mark, a small triangle in the upper left corner.

Keep going, please...

D8		:	✕ ✓ fx	=C7*D8		
	A	B	C	D	E	F
1	Price	3.25				
2	Start	100				
3	Increment	5				
4						
5	Date	Product	Net	Quantity	Revenue	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	
8	July 3, 2013	Pigs	$ 3.25	110	=C7*D8	
9	July 4, 2013	Pigs	$ 3.25	115	$ 373.75	

7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	
8	July 3, 2013	Pigs	$ 3.25	110	$ 357.50	
9	July 4, 2013	Pigs	$ 3.25	115	$ 373.75	

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3 Manage Workbook Changes: Identify Errors

Formulas -> Formula Auditing->Error Checking

Error Checking Options

2. Try This: Run Error Checking
Select Cell E8.
Go to **Formulas -> Formula Auditing**.
Go to **Error Checking->Error Checking**.

What Do You See? The Error Checker found that the formula in Cell E8 is inconsistent: it is not the same as the formula in the Row above.

The Error Checking Options include:
Copy Formula from Above
Help on this error
Ignore Error
Edit in Formula Bar.

If you have a LOT of problems with your formulas you can use the Previous and Next buttons to navigate through your Error Checking.

Keep going, please...

Trace Precedents   Show Formulas
Trace Dependents   ! Error Checking ▼
Remove Arrows ▼   ! Error Checking...
                     ! Trace Error
                     Circular References ▶

5	Date	Product	Net	Q
6	July 1, 2013	Pigs	$ 3.25	
7	July 2, 2013	Pigs	$ 3.25	105 $ 341.25
8	July 3, 2013	Pigs	$ 3.25	110 $ 357.50
9	July 4, 2013	Pigs	$ 3.25	115 $ 373.75
10	July 5, 2013	Pigs	$ 3.25	120 $ 390.00

Error Checking

Error in cell E8

=C7*D8

Inconsistent Formula

The formula in this cell differs from the formulas in this area of the spreadsheet.

Copy Formula from Above

Help on this error

Ignore Error

Edit in Formula Bar

Options...   Previous   Next

| 21 | July 22, 2013 | Pigs | $ 3.25 | 175 $ 568.75 |

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Identify Errors

Error Checking Rules

Error Checking Rules can be found by clicking on the Options button when you are in the Error Checker.

3. Try This: Review the Options
The **Error Checking** is still open. Click on **Options**.

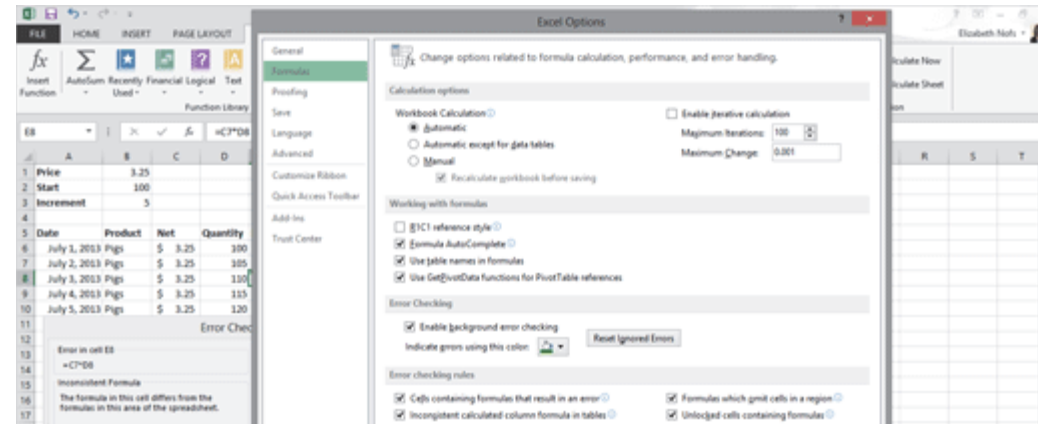**What Do You See?** Error Checking is enabled by default.

The Error checking rules include:
Cells that result in an error
Inconsistent formulas in tables
Years that are only 2-digits
Numbers formatted as Text
Formulas which omit cells
Unlocked cells which have formulas
Formulas that refer to empty cells
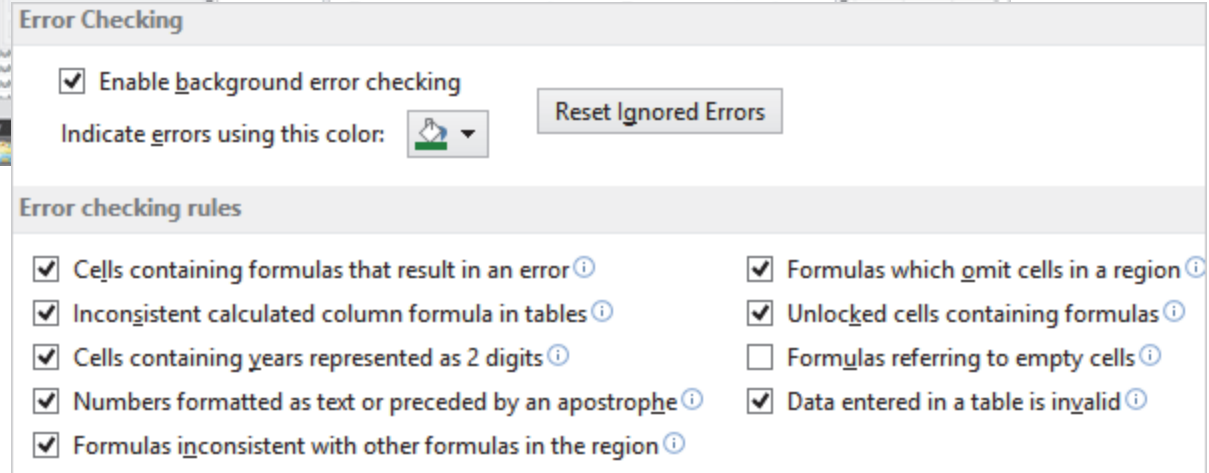Data that is invalid

Click **OK** to CLOSE the Error Checking Options. Cell E8 still has an error. Click **Copy Formula from Above** to fix it.

Then CLOSE the Error Checking window to return to the spreadsheet.

Formulas -> Formula Auditing->Error Checking->Options

3

Error Checking

☑ Enable background error checking

Indicate errors using this color: 🎨 ▼   Reset Ignored Errors

Error checking rules

☑ Cells containing formulas that result in an error ⓘ   ☑ Formulas which omit cells in a region ⓘ

☑ Inconsistent calculated column formula in tables ⓘ   ☑ Unlocked cells containing formulas ⓘ

☑ Cells containing years represented as 2 digits ⓘ   ☐ Formulas referring to empty cells ⓘ

☑ Numbers formatted as text or preceded by an apostrophe ⓘ   ☑ Data entered in a table is invalid ⓘ

☑ Formulas inconsistent with other formulas in the region ⓘ

Exam 77-427 Microsoft Excel 2013 EXPERT
1. Manage and Share Workbooks
1.3   Manage Workbook Changes: Identify Errors

Summary

This lesson introduced **Formulas** and **Formula Auditing**. The focus of each exercise was on the **Cell References**. We looked at the differences between **Relative** and **Absolute** Cell References.

Well, you done good.
You get the cookie. <grin>

	A	B	C	D	E	F
1	**Price**	3.25				
2	**Start**	100				
3	**Increment**	5				
4						
5	**Date**	**Product**	**Net**	**Quantity**	**Revenue**	
6	July 1, 2013	Pigs	$ 3.25	100	$ 325.00	
7	July 2, 2013	Pigs	$ 3.25	105	$ 341.25	
8	July 3, 2013	Pigs	$ 3.25	110	$ 360.00	
9	July 4, 2013	Pigs	$ 3.25	115	$ 373.75	
10	July 5, 2013	Pigs	$ 3.25	120	$ 390.00	
11	July 8, 2013	Pigs	$ 3.25	125	$ 406.25	

Practice Activities

Lesson 1: Legs, Eggs and Pigs

Before You Begin: Start Microsoft Excel. Open a new, blank spreadsheet.

Try This: Do the following steps

1. Enter the following labels in Row 1, beginning with Cell A1: Date, Location, Sales, Profit. Format Row 1 as Bold.
2. Select A2. Enter: January
3. Select A2. Use the AutoFill command to fill January through December in Column A.
4. Select B2. Enter the location as Ann Arbor. Use the AutoFill command to fill the location through December
5. Select D2. Enter the formula for Profit. Profit is 25% of the Sales. Use the AutoFill to fill the Formula from D2:D13.
6. Go to the bottom of Columns C and D, use the AutoSum command to find the total Sales and total Profit for the year.
7. Copy Sheet 1 two times.
8. Rename Sheet 1 to Ann Arbor.
9. Rename Sheet 2 to Detroit. Change the Location to Detroit and AutoFill.
10. Rename Sheet 3 to Lansing. Change the Location to Lansing and AutoFill.
11. Adjust the column widths where necessary to fit the contents.
12. Go to the Ann Arbor sheet. Enter the sales for January as $10,000. Format the column to be Accounting. Enter the sales for February as $11,000. AutoFill down. The increment is an increase of sales each month.
13. Go to the Detroit sheet. Insert 3 blank rows at the top of the sheet. Add labels in column A for **Start** and **Increment**. Enter the value $15,000 for start. For increment enter 5,000. Enter the formula in the Sales. January is $15,000, the starting point. February and beyond will be start plus increment. Create an Absolute Reference for the Increment. Use AutoFill and fill down.
14. Go to the Lansing sheet. Insert 3 blank rows at the top of the sheet. Add labels in column A for **Start** and **Increment**. Enter the value $20,000 for start. For increment enter 110%. Enter the formula in the Sales. January is $20,000, the starting point. February and beyond will be start times the increment. Create an Absolute Reference for the Increment. Use AutoFill and fill down.
15. Insert a new blank sheet in the workbook. Rename the sheet Totals.
16. Enter the following labels on the Totals sheet: Month, Sales, Profits
17. Enter January in Cell A2 and AutoFill through December.
18. Enter the formula for Sales to add the three locations (make sure you select January across all three sheets—remember that Detroit and Lansing have the reference rows at the top.)
19. Use the AutoSum to add the total sales and total profit on the Totals sheet.
20. SAVE as YOUR NAME Legs Eggs and Pigs Practice.

Test Yourself

1. Where is the command that formats the Date & Time?
a. Insert Ribbon
b. Format Ribbon
c. Home Ribbon
d. Cells Ribbon
Tip: Intermediate Excel, page 16

2. AutoFill for dates is the same as Copy and Paste.
a. True
b. False
Tip: Intermediate Excel, page 18

3. You can rename a sheet in Excel from Sheet 1 to Eggs.
a. True
b. False
Tip: Intermediate Excel, page 25

4. What does it mean when Excel displays ######?
a. The data doesn't make sense (such as adding text to numbers)
b. The column is too narrow
c. Nothing for the formula to reference (such as a blank cell)
d. You made an error
e. Unspecified Error
Tip: Intermediate Excel, page 27

5. What does it mean when Excel displays #REF!
a. The data doesn't make sense (such as adding text to numbers)
b. The column is too narrow
c. Nothing for the formula to reference (such as a blank cell)
d. You made an error
e. Unspecified Error
Tip: Intermediate Excel, page 29

6. Which is NOT a valid formula?
a. =B1
b. B1
c. =B1*B3
d. =SUM(B1:B20)
Tip: Intermediate Excel, page 34

7. What does it mean when Excel displays #VALUE ?
a. The data doesn't make sense (such as adding text to numbers)
b. The column is too narrow
c. Nothing for the formula to reference (such as a blank cell)
d. You made an error
e. Unspecified Error
Tip: Intermediate Excel, page 35

8. Which is true about Relative & Absolute References? (Select all correct answers)
a. When the fill command is used, a relative reference updates each row to match the new location
b. The F4 key turns a Relative Reference into an Absolute Reference.
c. A mixed reference has both Relative and Absolute References
d. $A$4 is an Absolute Reference
Tip: Intermediate Excel, page 37

9. Which command shows the formulas?
a. View-> Formulas-> Show
b. Formulas-> Formula Auditing-> Show Formulas
c. Formulas-> Reveal Formulas
Tip: Intermediate Excel, page 44